**8.5B Notes and Fundamental Questions**

The student is expected to identify that protons determine an element’s identity and valence electrons determine its chemical properties, including reactivity.

**Fundamental Questions**

* What can be used to identify an element?

The atomic number (number of protons) is used to identify an element.

* What are energy levels in an electron cloud?

Energy levels are areas around the nucleus of an atom that contain electrons. The outermost level contains the valence electrons. The energy level closest to the nucleus is the lowest energy level and fills up with electrons first.

* What are valence electrons? Where are they located?

Valence electrons are the electrons located in the outermost (highest) energy level. They determine the reactivity, or chemical behavior of the atom.

* How are valence electrons involved in the chemical properties of an element?

Atoms “want” to have a full outer electron shell (octet rule/ 8 atoms except for He and H). The reactivity of the atom is determined by the tendency of an atom to either gain or lose electrons in order to have 8 electrons in the outermost shell.

* How do the valence electrons affect the reactivity of an atom?

Atoms with a full outer shell will not chemically react in the presence of other atoms. For example, the noble gases all have full outer shells, so they do not react. Atoms that need to gain or lose just one electron are the most reactive, followed by those that need to gain or lose 2 electrons, and then those that need to gain or lose 3 electrons. Atoms that have 4 electrons in the outer shell tend to share electrons.